



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,001	10/15/2001	Takeshi Uchida	566.39787CX1	9500

20457 7590 01/30/2004

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-9889

EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT PAPER NUMBER

1765

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/976,001

Applicant(s)

UCHIDA ET AL.

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-13 is/are allowed.
- 6) ☒ Claim(s) 3, 6-9 and 14-17 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- ☐ Interview Summary (PTO-413) Paper No(s). _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Affidavit

1. The affidavit under 37 CFR 1.132 filed 9/9/2003 is sufficient to overcome the rejection of claims 10-13, based upon the and 102 rejection of the claims.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 3, 6, 9, and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Sasaki et al. (US 5,770,095).

Sasaki teaches, “. . . a polishing agent containing a chemical agent responsible for forming a protection film on the surface of a film made of the material containing a metal as a main component by reacting with the material, and containing etching agent consisting of the aforementioned materials(s)” (column 4, lines 44-50). “Examples of the materials containing a metal as a main component include those containing Cu, Cu alloy, . . . and the like” (column 3, lines 33-37). “It is preferred that the polishing agent herein should contain an aminoacetic, amidosulfuric acid . . . , an oxidizing agent, water, and **benzotriazole** (same as applicants’ protective-film forming agent) . . .” (column 4, lines 44-53). “For example, the etching agent containing an aminoacetic acid such as

Art Unit: 1765

glycine (same as applicants' protective-film forming agent), . . . and an oxidizing such as **hydrogen peroxide** (same as applicants' additive) . . . may be used. Another etching agent may be used which is an aqueous solution of . . . ammonium salts such as ammonium persulfate, ammonium nitride or an ammonium chloride, and an chromic acid (examples of applicants' oxidized metal dissolving agent)" (column 4, lines 1-9). " . . . CMP may be carried out in one step using a polishing agent containing the aforementioned chemical agent and etching agent" (column 4, lines 24-26). The aforementioned reads on,

A polishing solution for polishing a metal film surface, comprising:

(1) an additive (2) a protective film-forming agent and (3) water. Since Sasaki uses the same components of a polishing agent to etch and polish the same type of metal surface as claimed in the present invention, then using Sasaki's hydrogen peroxide (same as applicants' additive) in the same manner as that of the claimed invention would inherently result in an additive which is capable of etching the metal film surface at an etching rate of 10nm/minute or lower. Since Sasaki uses the same components of a polishing agent to etch and polish a Cu metal surface as claimed in the present invention, then using hydrogen peroxide (same as applicants' additive) and benzotriazole (same as applicants' protective film-forming agent) of Sasaki's polishing agent would inherently result in a protective film-forming agent, which in combination with said additive, is capable of removing the metal film surface by chemical mechanical polishing at a polishing rate of at least 100 nm/minute and an etching rate of not more than 10 nm/minute, **as in claim 3.**

Since Sasaki uses the same components of a polishing agent to etch and polish the same type of metal surface as claimed in the present invention, then using Sasaki's polishing agent in the same manner as in the claimed invention would inherently result in a polishing solution, which is adapted to polishing a metal film surface including a material that contains at least one of copper, a copper alloy, a copper oxide and a copper alloy oxide, **in claim 9**.

The above said aforementioned further reads on: The polishing agent solution, consisting essentially of said additive, said protective film-forming agent and water, **in claim 6**;

A polishing solution for polishing a metal film surface comprising:

(1) an oxidized metal dissolving agent, (2) an additive, (3) protective film-forming agent, and (4) water. Since Sasaki uses the same components of a polishing agent to etch and polish the same type of metal surface as claimed in the present invention, then using Sasaki's hydrogen peroxide (same as applicants' additive) in the same manner as that of the claimed invention would inherently result in (2) an additive which is capable of forming a protective film by at least one of physical adsorption and chemical linkage on the metal film surface. Since Sasaki uses the same components of a polishing agent to etch and polish the same type of metal surface as claimed in the present invention, then using **hydrogen peroxide** (same as applicants' additive) **benzotriazole** (same as applicants' protective-film forming agent) of Sasaki's polishing agent in the same manner as the claimed invention would inherently result wherein a combination of the

additive and of the protective film-forming agent controls etching rate, while maintaining chemical polishing rate of said metal, **in claim 14.**

Since Sasaki uses the same components of a polishing agent to etch and polish the same type of metal surface as claimed in the present invention, then using Sasaki's polishing agent in the same manner as that of the claimed invention would inherently result in the solution being capable of removing the metal film surface by chemical mechanical polishing at a polishing rate of at least 100nm/minute and at an etching rate of at most 10nm/minute, **in claim 15.**

The said aforementioned further reads on,

wherein additive includes an oxidizing agent that oxidizes the metal of the metal film surface, **in claim 16;** and

consisting essentially of said oxidized metal dissolving agent, said additive, said protective film-forming agent and water, **in claim 17.**

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (US'095) as in view of Kodama et al. (US 5,733,819), as applied to claim 3 above.

Sasaki differs in failing to teach said protective film-forming agent is selected from the group consisting of compounds as recited in the claims.

Kodama teaches, "Further, in the preparation of the polishing composition, various conventional additives may further be added, as the case requires, depending upon the type of the object to be polished, the polishing conditions and other requirements for polishing, for the purpose of stabilization or quality maintenance of the product. Typical examples of such additives include . . . (c) water-soluble alcohols (same applicant's protective film-forming agent having an alcoholic group), such as ethanol, propanol and ethylene glycol, . . . and . . . (e) . . . a polyacrylate (same as applicant's film-forming group selected from the group consisting of polymethacrylates)," as respectively in claims 7 and 8.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Sasaki by using Kodama's film forming agents as additives in a polishing composition for the purpose of stabilization or quality maintenance of the product (Kodama, column 6, lines 33-34).

Response to Arguments

6. Applicants' arguments with respect to claims 3-9 and 14-19 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

7. Claims 4-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: No prior art teaches nor render it obvious to combine a polishing solution that comprises another protective film-forming agent that has properties different from those of a protective film-forming agent, and that controls the etching rate to not more than 10 nm/min without incorporating said protective film-forming agent, said protective film-forming agent and said another protective film-forming agent together controlling etching rate, while maintaining chemical mechanical polishing rate of the metal film surface to have a polishing rate of at least 100 nm/minute and the etch rate of not more than 10 nm/minute, along with the other limitations of claims 4 and 5.

9. Claims 10-13 are allowed.

10. The following is an examiner's statement of reasons for allowance: The affidavit under 37 CFR 1.132 filed 10/16/03 is sufficient to overcome the 102 rejection of claims 10-13 based upon applicant establishing and providing evidence that Sasaki's (US 5,770,095) aminoacetic and/or amidosulfuric acids do not qualify as agents corresponding to the e.g., second protective film-forming agent according to the present invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

Art Unit: 1765

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

ltue

January 23, 2004

SUPERVISOR
NADINE G. NORTON
PRIMARY EXAMINER

